

Comparison of Observed AMSU/HSB Brightness Temperatures with Calculated for July 4 and 20, 2002

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The co-located PREPQC radiosonde matchups from July 4 and July 20, 2002 were used to calculate brightness temperatures from the microwave channels. The forward calculation was very similar to that described in my TGRS-Aqua-issue preprint (where NOAA-15 data was used), except that sidelobe corrections have not been made here, and the differences are plotted vs. scan angle instead of incidence angle. Within the matchup golfball, the HSB footprint closest to the raob was selected for the comparison, and only one matchup was used per raob. The channels peaking higher in the atmosphere than ch.10 (at 50 hPa) had fewer radiosondes that extended to the required high altitudes, and are not included here.

In the plots, the solid line shows the local mean at each scan angle and "local deviation" is the standard deviation about the local mean. Differences larger than the vertical plot range are not used in the statistics, but the number of these outliers is noted. The dotted lines show the biases obtained by GSFC using analysis fields, which provide more points for comparison, hence a smoother curve than for the radiosondes.

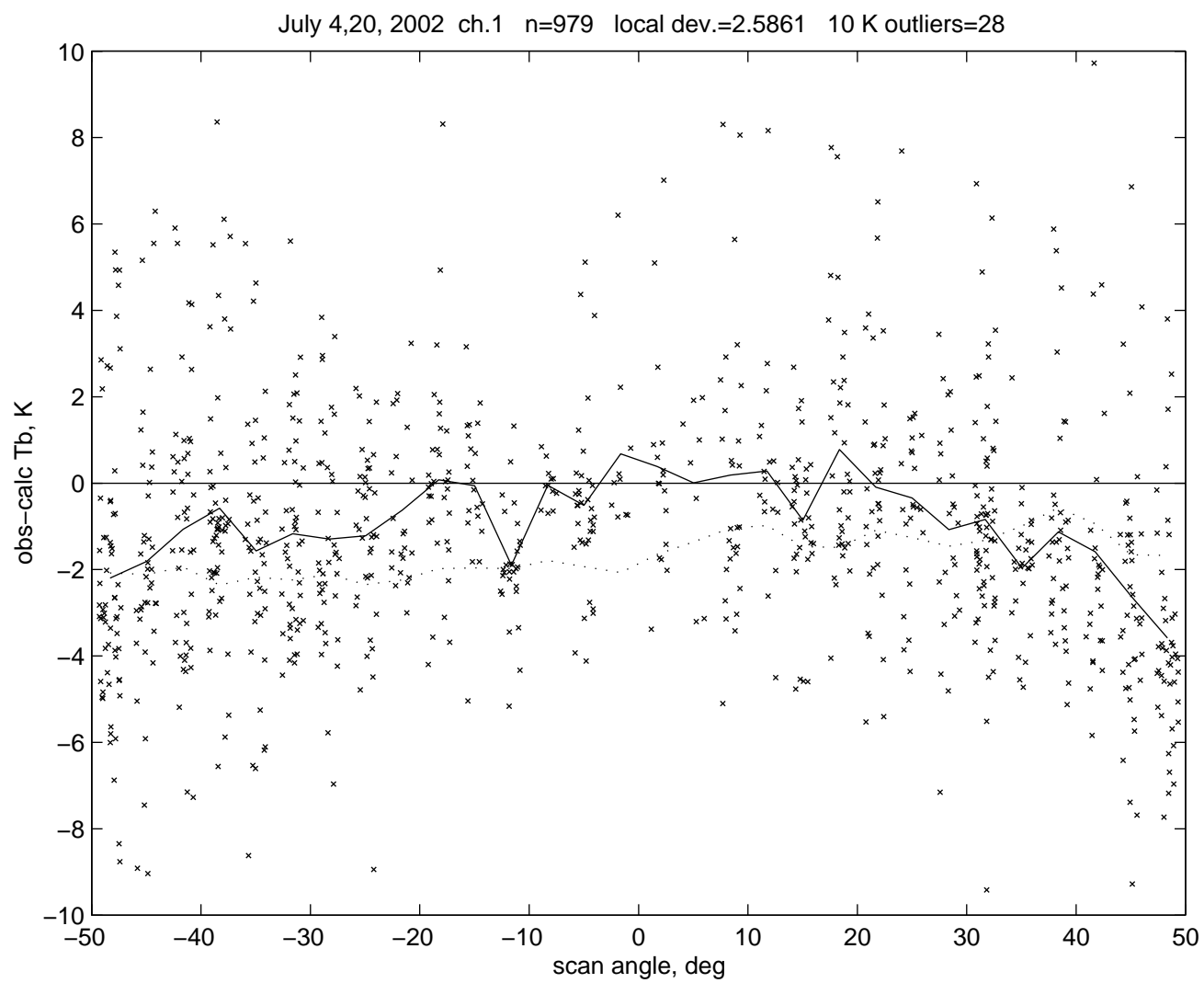
Comments:

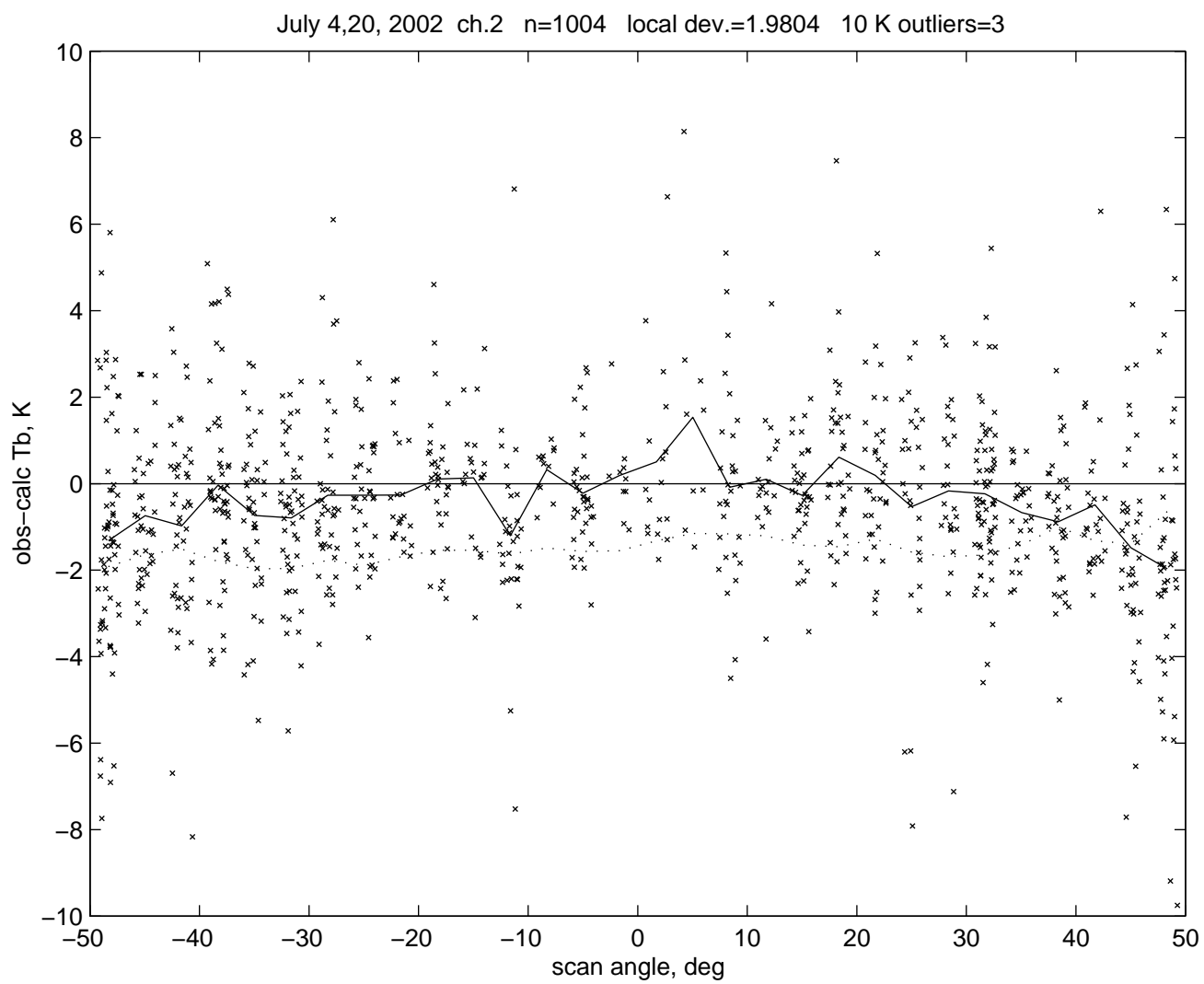
Profiles with retrieved liquid water integral > 0.1 mm were excluded. However, this test may not exclude all significant clouds; in simulations the retrieval misses some clouds over land.

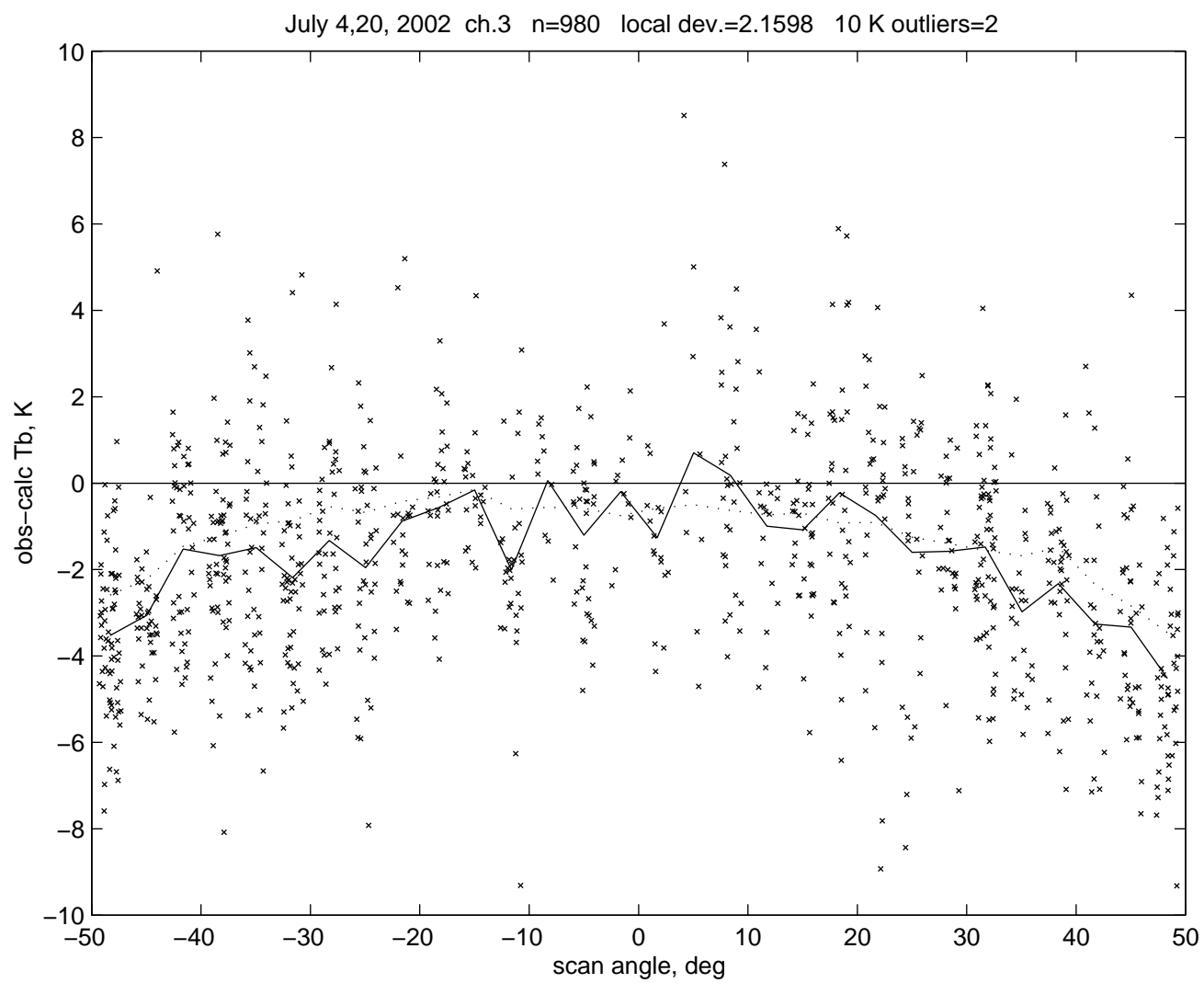
The window channels (1-3, 15) and water vapor channels (17-20) have mean differences similar to the oxygen-band channels (4-10), but the deviations from the mean are much larger than in the oxygen band. Surface emissivity is a source of extra variability on some of these channels, and possibly the horizontal variability of water vapor in the atmosphere is also a contributing factor. Transmittance errors would probably introduce mean errors as well as variance in T_b .

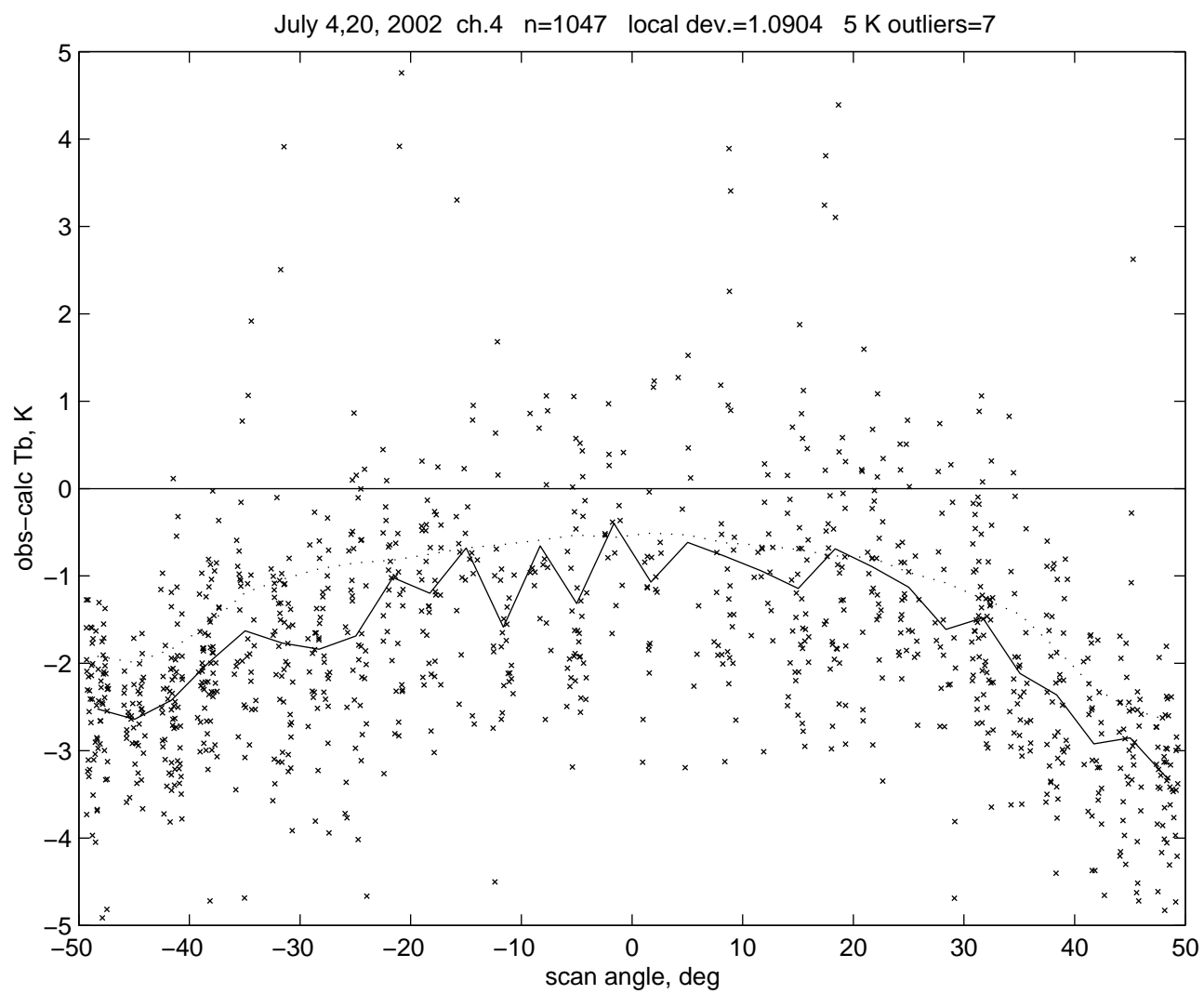
In general, there is fairly good agreement between the solid and dotted lines, although some channels have differences that may be significant.

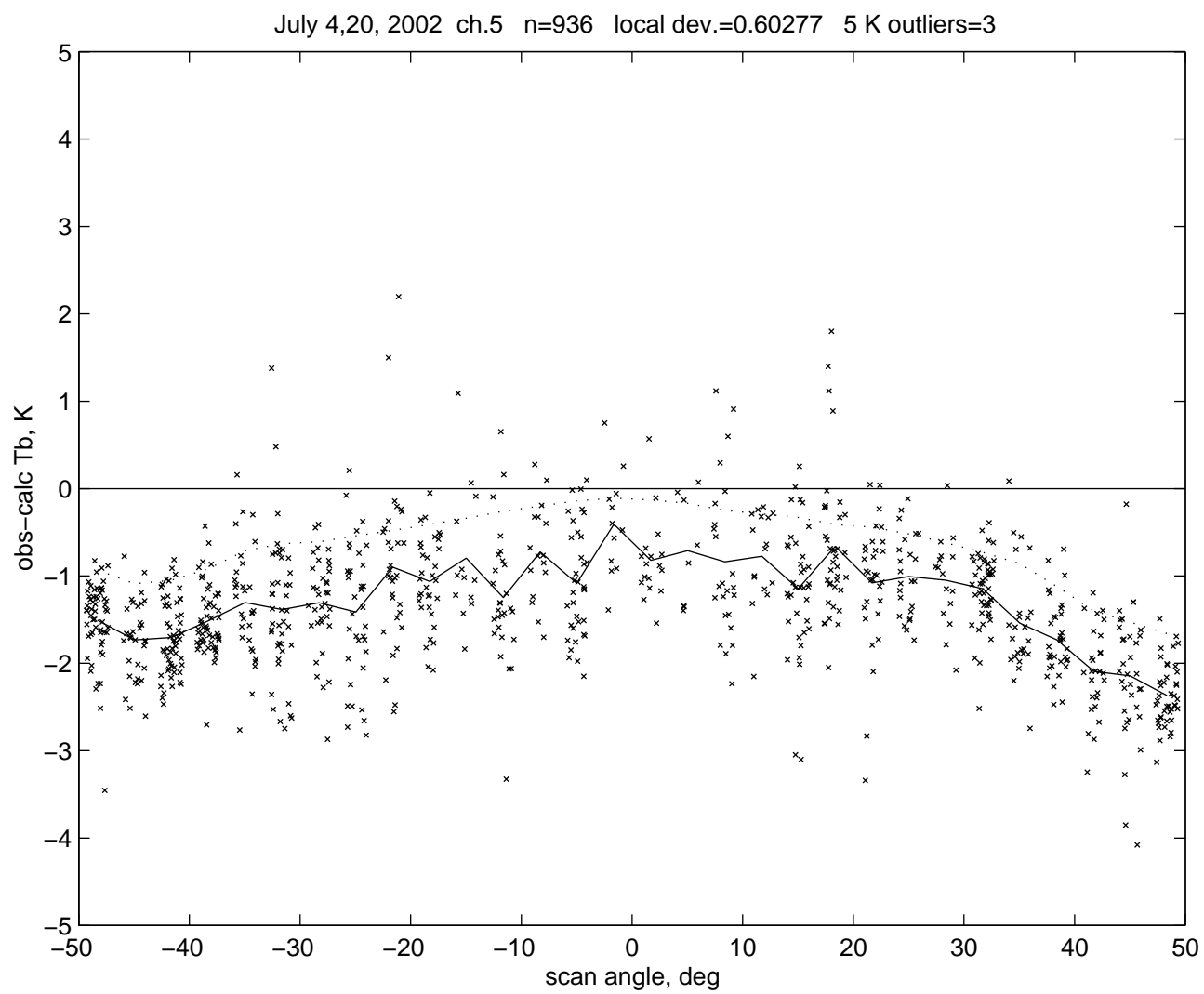
There is not much dependence of error statistics on time difference (max. 3 hr. here).

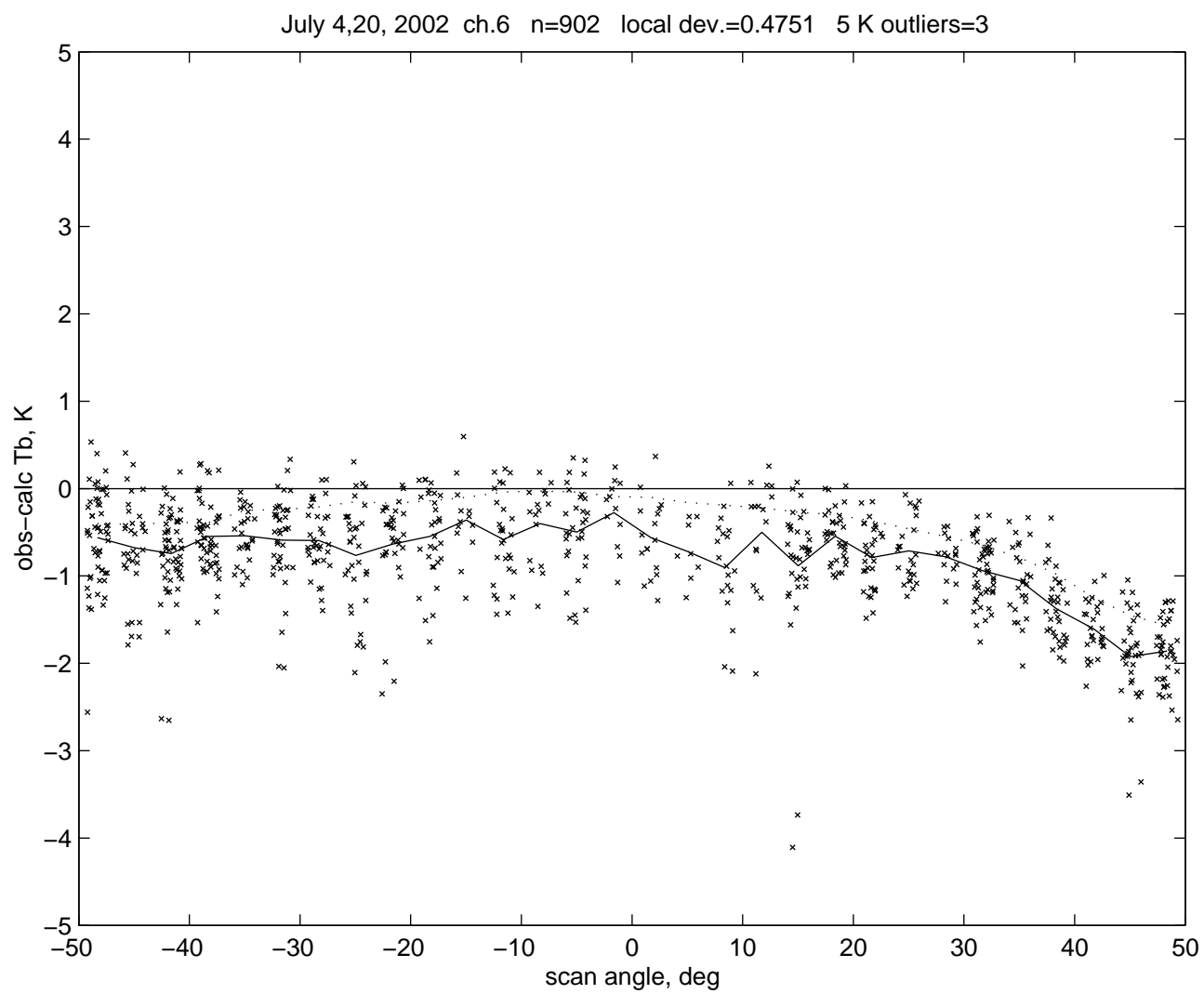




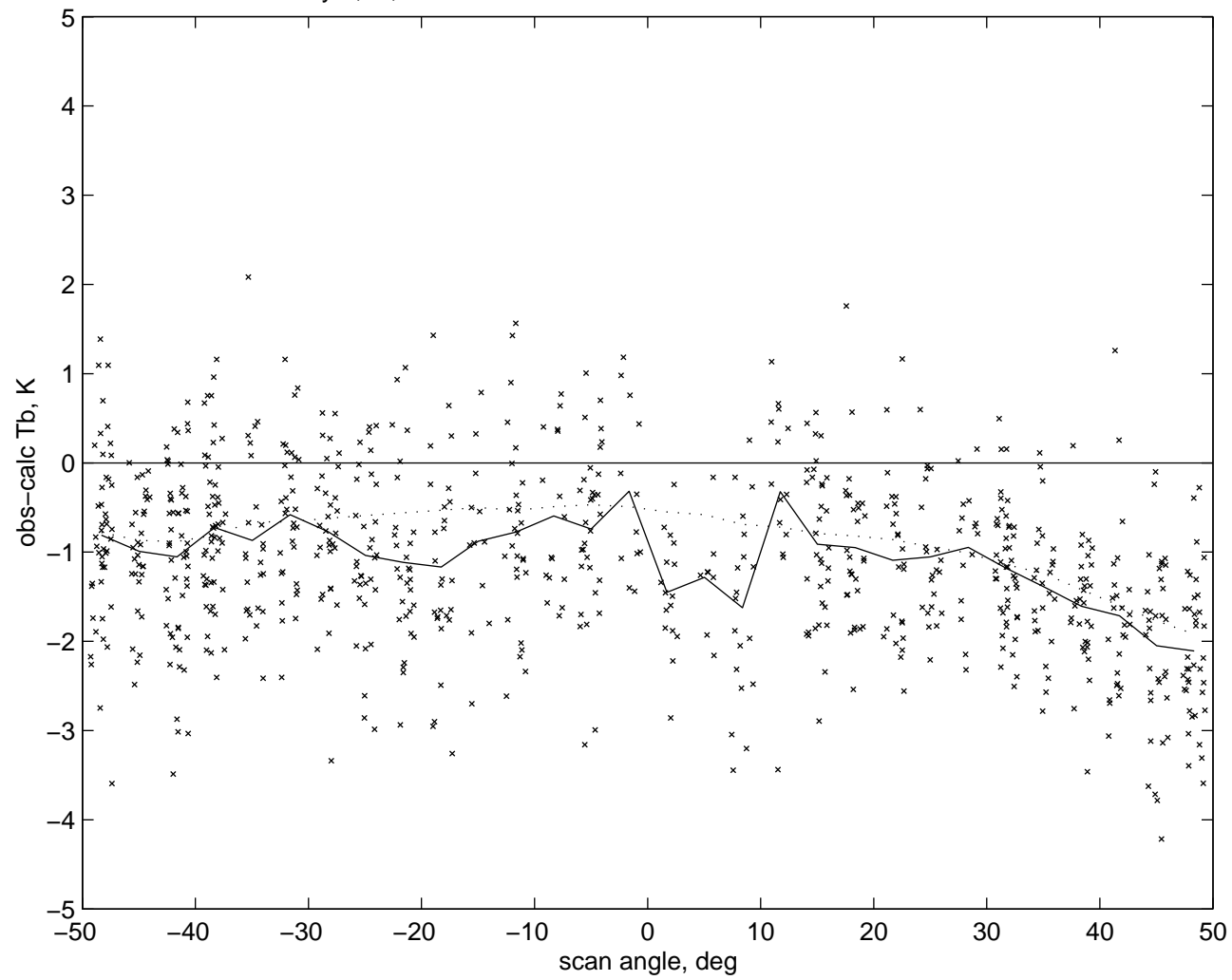


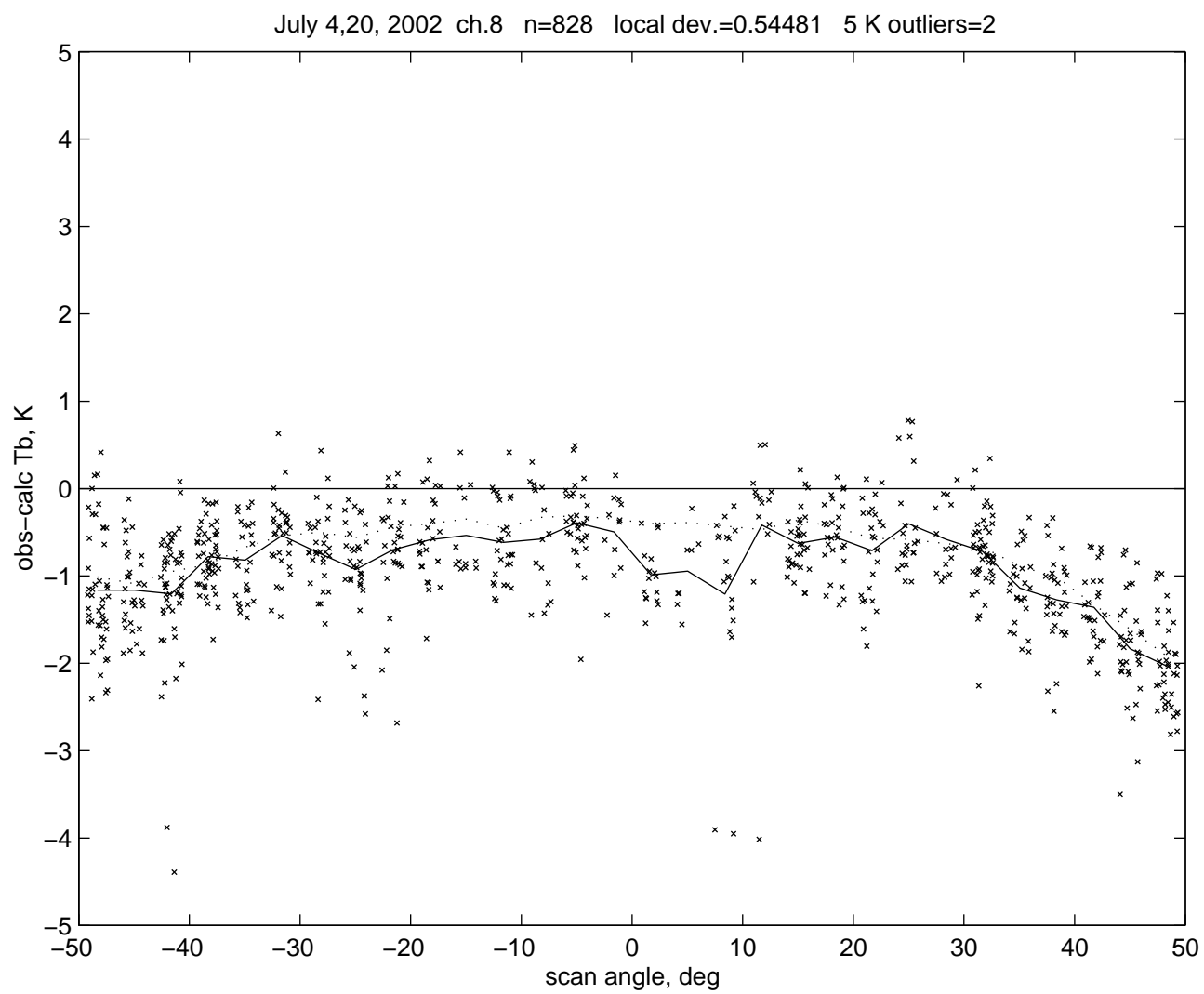


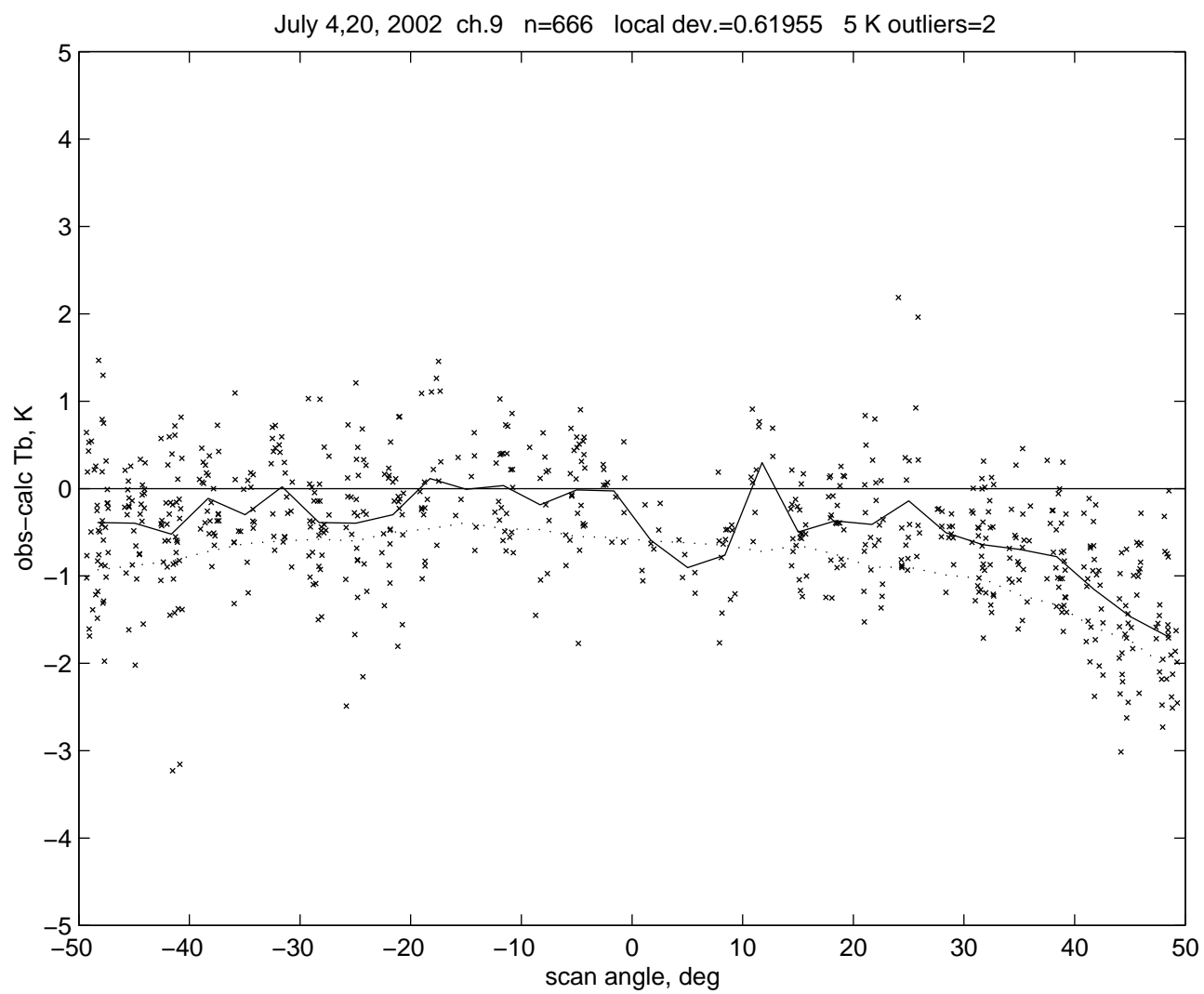


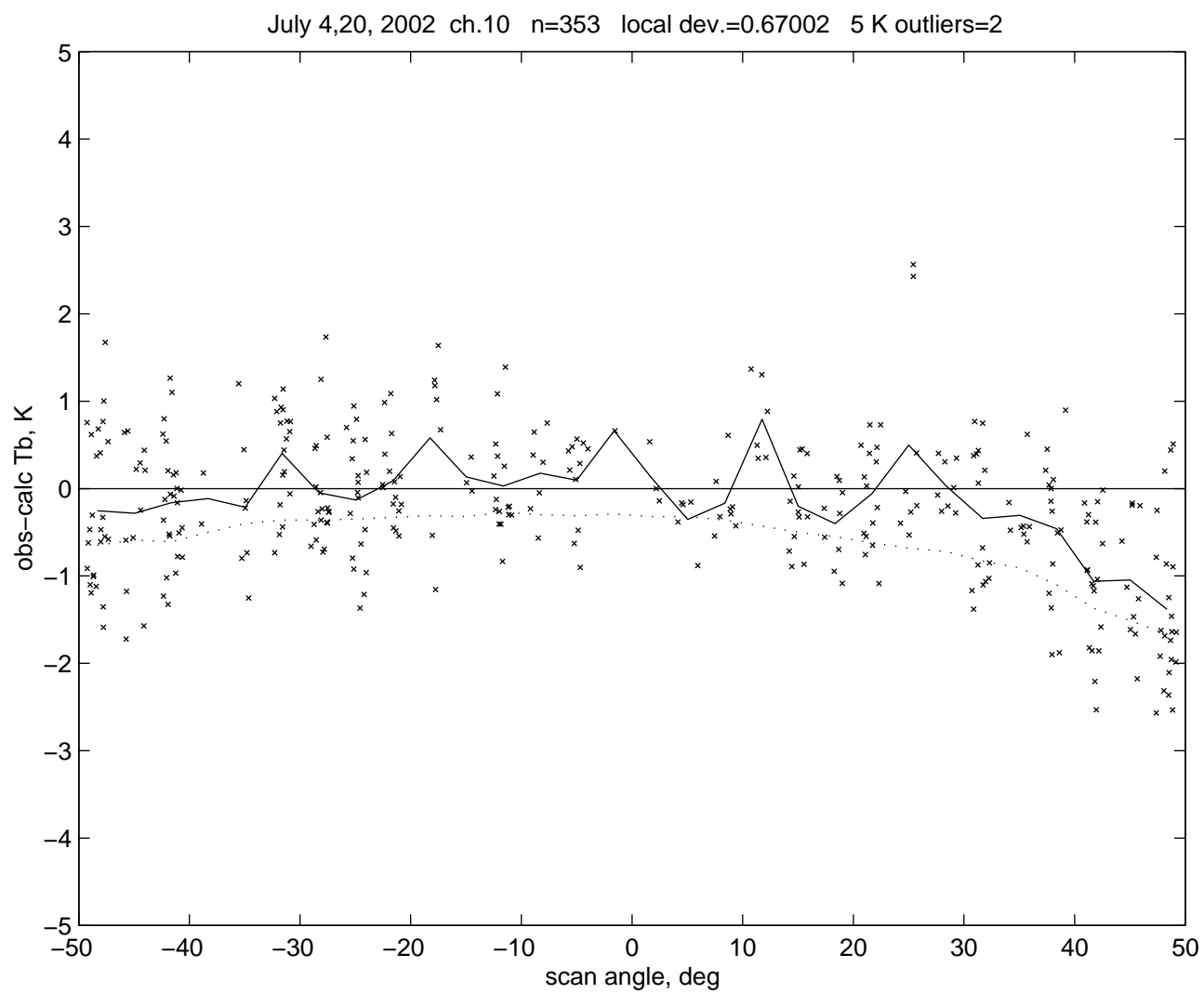


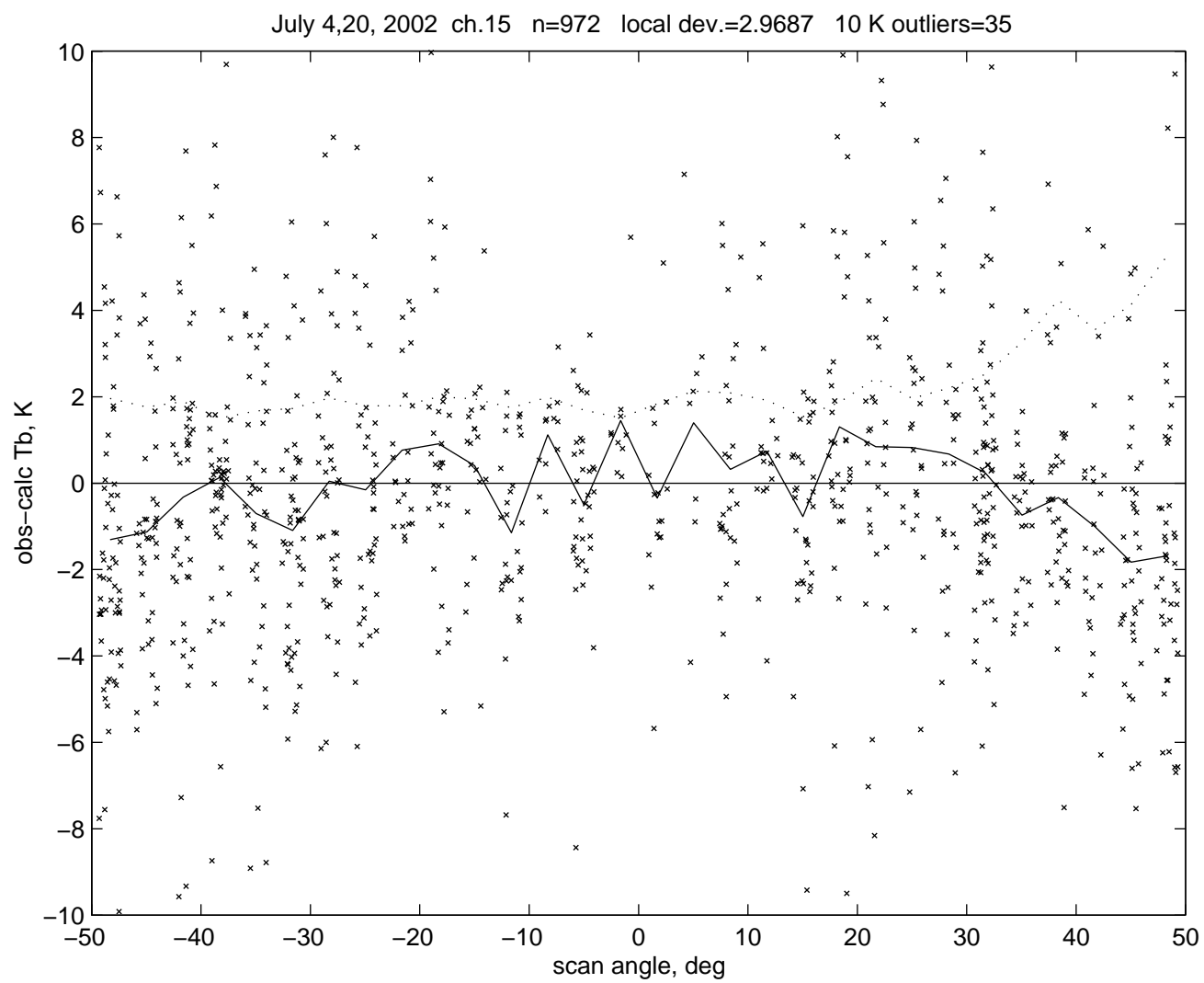
July 4,20, 2002 ch.7 n=842 local dev.=0.8731 5 K outliers=2

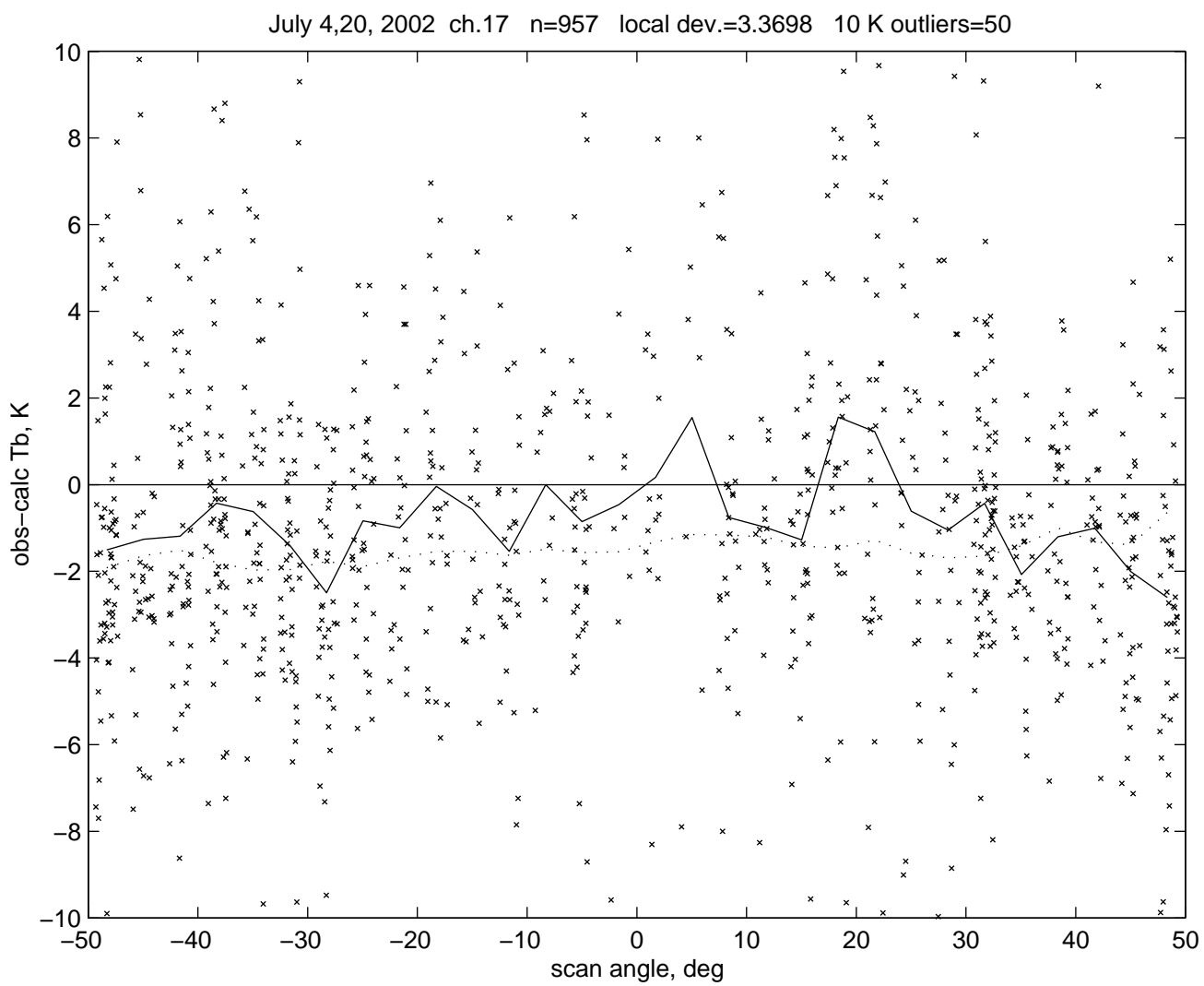


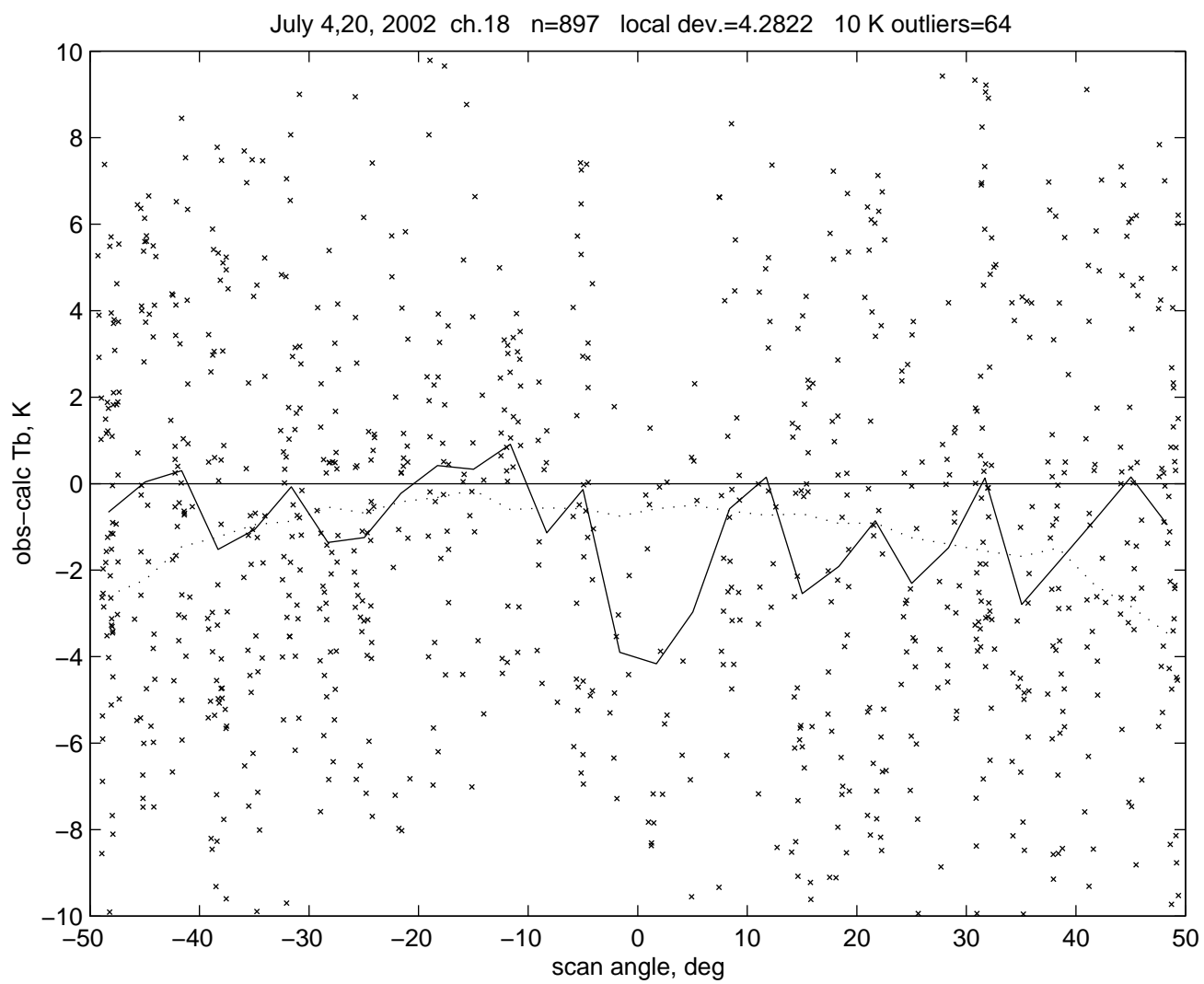




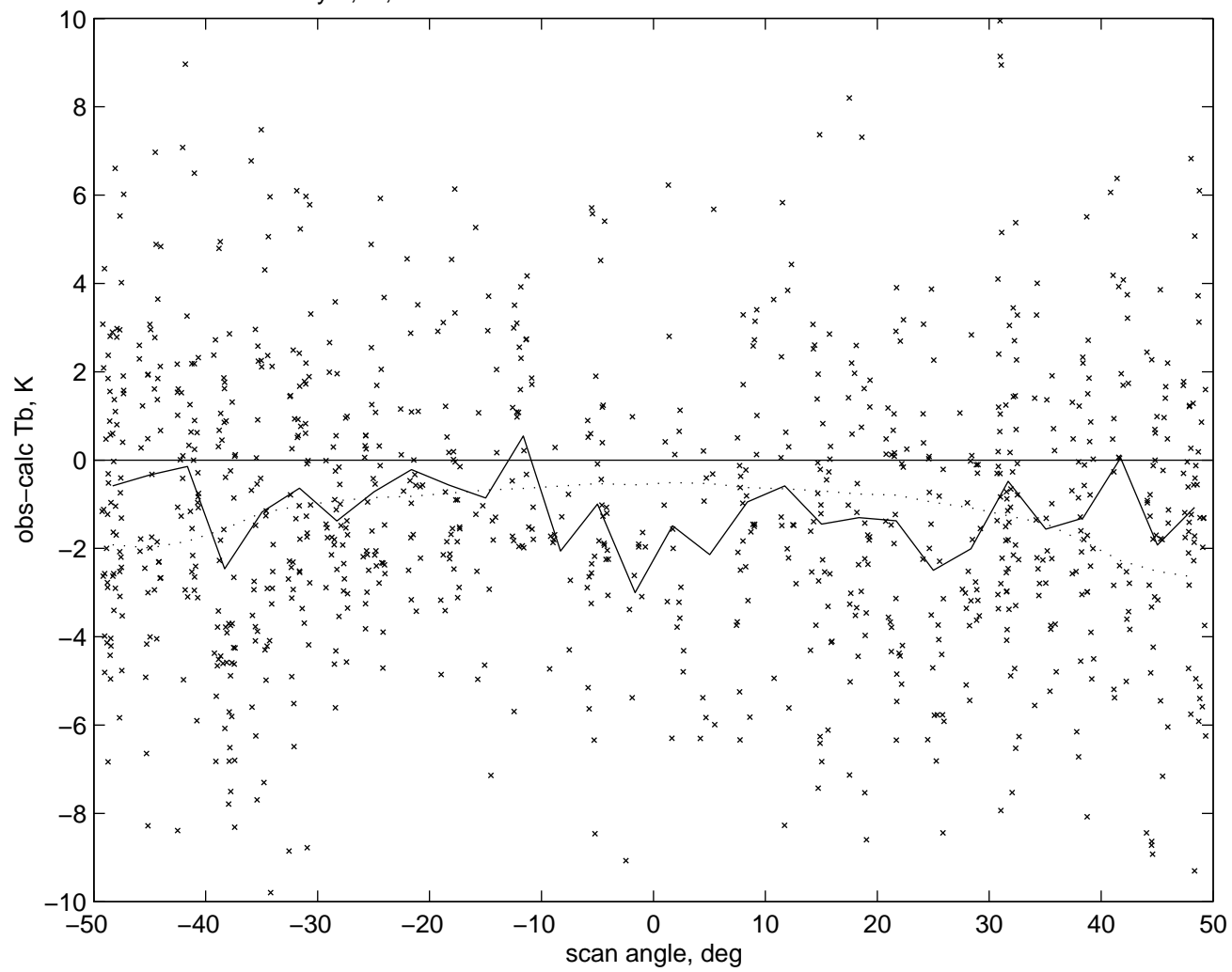








July 4,20, 2002 ch.19 n=960 local dev.=3.077 10 K outliers=22



July 4,20, 2002 ch.20 n=983 local dev.=2.3384 10 K outliers=7

